

LÁSZLÓ VARGA¹**New Dimensions in the Interpretation of Early Childhood²**

The period up to eight years is considered to be the peak time for brain development. From birth to about the age of eight the brain is a super-sponge. This is the brain's most absorbent stage, where it actively learns from its environment. "Windows of opportunity" are sensitive periods in children's lives when specific types of learning take place. Information flows easily into the brain through 'windows' that are open for only a short duration. Then the 'windows' close, and much of the fundamental architecture of the brain is completed. Scientists are continually learning more about how young children's brains develop. At the same time, teachers are looking for effective strategies to help children use their brains to their fullest capacity. This paper also contributes to this dialogue by summarizing what we already know about the learning process in the brain and suggests how it might form the teaching and learning process in the classroom.

1. Introduction

Interpretation and understanding the first years of human life, early childhood and childhood have undergone paradigmatic changes in the last few years. The latest national and international researches emphasize childhood as a key factor in the course of life of the individual. Developing and educating children is crucial for the progress of a nation and the development of the economy, since only happy, well-balanced, talented children are able to build a prospering and sustainable society. In case the investment in children and families happens in a bright way, the next generation will surely pay it back. Looking at our children from a wide perspective we can say that they are the citizens, workers, parents of tomorrow, the founders of the society of the future and the basis of the development of the economy. Intelligent investment is a kind of key in establishing a happy life, so there is an unlimited chance and extreme responsibility on our shoulders, since early years last forever.

It is therefore vitally important that student teachers have very high quality initial teacher education, supported by well-educated and knowledgeable lecturers and pedagogues. It is also

¹ Associate professor, University of Sopron, Benedek Elek Faculty of Pedagogy, Institute of Educational Sciences and Psychology; varga.laszlo@uni-sopron.hu

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important that qualified teachers and other adults working with our youngest children have access to, and opportunities for continual professional development throughout their career. Having highly qualified teachers for young children is vital as the early years are such an important stage of children's development and pave the way for all future learning.

A child's healthy development is a crucial factor in the growth of a nation and for the improvement of the nation's economy in view of the fact that a prospering and long sustainable society can only be maintained if 'its' children are well-balanced and armed with appropriate skills. Smart investment into the upcoming generation always pays off. The failure to ensure the necessities for the construction of a healthy and productive life might put our future and security at jeopardy. Early years teachers and educators are supported by a numerous amount of data based on scientific research into the early years of child development so as to be able to exploit all the possibilities of building up a firm, well-balanced society the most efficiently (Bruer, 1999).

It is indeed crucial that early childhood experts be required to understand the subtleties and significance of the developmental processes of the early years and the effects that childhood and early childhood development have on adult life and on every walk of life. Educators must show a proper command of scientific knowledge, or that of the factors defining early childhood development and improvement, and that of the connections between early childhood brain development and human development while they should also be familiar with the state of the art findings of neuroscience on the early years brain development (Sousa, 2011).

The quality of our lives depends on the relationship that we develop between us and the surrounding environment. Therefore, emotional intelligence issues are to be addressed in early childhood education as well. The establishment of proper social competencies and cognitive skills take place in early childhood, however, emotional intelligence is still an important factor to be detailed (Goleman, 1997).

In the research paper the discussion will point to the connections between emotions, love, early childhood and to the effects of early years' stress on adult life. It also offers insight into an educational theory, i.e. constructivism, which has absolutely different views on learning theories from its predecessors. The significance of constructivism in early years lies in the fact that all early years teachers should be aware of the learning mechanism that enables children to construct 'themselves' and their system of knowledge. They are also advised to have an insight into the nature and process of early childhood development and learning and to understand the neural, emotional and social backgrounds of the learning processes (Charlesworth, 2013). As childhood is the age of experience when the capability to act is high, and it is also the age of

the establishment of competencies, the understanding of early childhood learning is a fundamental factor. Early years teachers are supposed to help children in this most sensitive period of their lives to construct ‘themselves’ and to be able to see the world with their own eyes.

2. Childhood is the age of experience

At the end of the 20th century a new theory of knowledge was introduced, namely constructivism, the educational paradigm of which suggests that education should focus on the child as a learner and the child’s world inside. The founder of this educational philosophy was a Swiss psychologist, Jean Piaget who claimed that recognition is the internalisation of the real world outside by experience, and that knowledge is a system responding to and interacting with the environment as a result of active experience. Piaget (1970) suggests that knowledge is the outcome of the constructive function of the brain. It is the interaction between the inner world that is the cognitive system and the external world that is the experience.

Piaget’s apprentice Seymour Papert further elaborated the idea of constructivism (Papert, 1988) by suggesting that children should build up their own cognitive structures and that learning should happen without teaching. Papert claims that children’s motivation to learn and experience is mostly natural, they are intrinsically interested in their environment and the continuous observation of their surrounding environment is one of their major characteristics. The underlying unnoticed learning or recognition is exploratory and sensory dominated and often non-verbal, and controlled by the children themselves. This suggests that the constructing, creating and structuring mind of a child becomes the centre of attention instead of the cognitive processes. Learning takes place in the active, cognitive mind and it is being built on the already existing knowledge and on the continually expanding brain structures which are defined by literature as a mental map or world model (Cséfalvay, 1990). The freshly constructed knowledge, experience, skill will build into the structure created by the child consequently it becomes an internal part of the child with some personal hints and quality. Knowledge is thus not created by the teacher, who only facilitates the young children to construct their own structures, or at least they create the optimal environment to ensure the effective internal construction. This paradigm claims that teachers have a major role in exploring the prior knowledge (Nahalka, 2002) of children and in providing a supportive learning environment.

Considering the role of teachers or educators in the constructivist theory one might come to Maria Montessori's motto, i.e. "Help me to do alone." (Montessori, 1936).

The regular and traditional teaching-learning paradigm is considered to be cheaper, more elaborated, more sustainable, the knowledge is more easily gained. On the other hand, the constructivist learning-teaching paradigm is more expensive, it requires more preparation on behalf of the teacher, knowledge is sometimes delayed to form, moreover, this learning theory is not fully elaborated in a broader sense.

3. Early childhood brain development

An earlier (Pléh, 2003) scientific concept implied that the development of human brain was linear. Today it is known that there are sensitive periods during the development of the brain, and the most important period of all is the early childhood. When a child is born, the whole set of nerve cells is present in the brain, which means a set of 100 milliard nerve cells. The mess of the newborn's brain is only a quarter of the mess of an adult's brain, and at birth the networking starts and the nervous system begins to form. The fact that at birth a nerve cell has got 2500 connections (synapses) and then by the end of age 2 the same cell has 15000 connections clearly demonstrates how fast this growth is (Shore, 1997). The synaptic system shows extreme development in the first two years. According to neuroscientists (Ádám, 2004) the building up of the cerebral structure and network is principally stimulated by love, and stimulating environment and the experience. The cell delivering stimuli at the same time develops branched projections (dendrites, the magical trees of the mind) towards one another (Diamond and Hopson, 1999), so the network is continually forming. Each time the information runs through the nerve cell, the electrochemical effects strengthen the connections between the neurons, so the network grows. This is a very significant reason supporting the idea that a child needs an environment rich in stimuli and constant attention and care. The non-used or superfluous synapses will keep demolishing after the third year during the stabilisation of the network system. The overall build-up of the cerebral structure is a long process which starts before birth and goes on until becoming biologically adult. It is now known that the first three years mean the most important period to establish the neural connections, this is the time when 700 new connections are established in one second³.

³ <http://developingchild.harvard.edu/> [2017.10.13.]

Kluge (2003) suggests that early years teachers and educators should understand the responsibilities of their job, as the development of cerebral structure plays a firm but fragile at the same time role in the formation of future skills and behaviour patterns. The brains build up hierarchically from bottom to top, and by time more and more complex cerebral structures and networks are built up on simpler networks and skills. Loving care, adequate feeding and the experiences mutually form the developing brain's network system. Children often make an effort to establish connections with the adults around, who cannot avoid responding to them especially in the early years. It is important to re-emphasize the fact that the cognitive, emotional and social skills of a child are in inextricable relation to one another, and this way both our bodily and spiritual health are connected to each other throughout our whole life, and we cannot develop any of those separately in isolation. Unfortunately, as time passes by cerebral plasticity and the ability to change our behaviour constantly decrease. The brain is remarkably adaptive during its overall lifespan; however, if done in the right time, its forming can be more effective and efficient for the individual and thus for the society as well (Hámori, 2005).

4. Neuroscience and early childhood education

The latest national and international researches emphasize childhood as a key factor in the course of life of the individual. In recent years, research on young children's early brain (head) and emotional development (heart) have underscored its importance for later development. Integrating this 'Brain-Based, Heart-Felt' research into classroom practice, however, will require meaningful dialogue between educators and brain scientists to inform both research and ECE institutions. Our research group aims to bring educators and scientists together through the development of joint research projects to improve the understanding of how children learn and develop. Linking brain and EQ research to ECE is extremely valuable to our understanding of children development and learning. The research will provide educational sciences with lots of new information and data whereas it will also modify and complement the content of nursery school teacher and early childhood educator trainings as well as the innovation of early childhood educational and research facilities.

Neuropedagogy includes two major areas: the effects of neurology on the practice of education and the knowledge teachers have on the nature of learning. The brain of a child is not ready when born; we can say that the brain is our only preterm organ. The prime time for brain development is the first eight years of life, the brain develops at a very fast pace, by the time of

year three the brain network is extensively developed (Wasserman, 2013). Due care and education at early years influence the build-up of the brain network and structure to a great extent. From birth to the eighth year of existence brain behaves like a magic sponge⁴ – it absorbs everything. This is the most sensitive phase of the development of the mind, a “window for opportunities”⁵, this is the time when we learn the most from our environment. However, this window is not open for a long time, and at the age of 8 it slowly starts to close and the building-up process slowly comes to an end.⁶

There have been paradigmatic changes in the interpretation of the early years of our life path in the recent years (Shore, 1997). Education and development of children are critical questions for the growth of a nation and economy as only happy, well-balanced and skilled children can become basis of a prospering society. What we give or what we lack to give to our children at early years is crucial. If newborns and infants have only limited possibilities to experience themselves and their environment with their parents, the appropriate neural network may not develop properly, thus their ability to address the world properly may get damaged. Addressing the world is the first step in the school of human learning. Trauma, toxic stress may lead to the malfunction of emotional development which will lead to learning dysfunctions and disabilities. Neurologists continually research (Sprenger, 2008) into the development of children’s nervous system, while practicing teachers work on the efficient learning strategies to help children explore their possibilities and the greatest per cent of their brain capacity.

5. Conclusion

Recent years’ research into the children’s brain and emotional development emphasise the significance of childhood’s role in the later life of the individual. They suggest that this is a key and determining period (Evangelou, Sylva and Kyriacou, 2009). Following the research trends of brain and emotional development, a scientific dialogue may be launched between teachers and neurologists trying to find the applicability of neurology research data to education. We also facilitate and promote the dialogue between scholars and scientist who foster the importance of early childhood educational theories, childhood neurology and emotional development. Scientists are working hard to form new educational views, innovation based on

⁴ <https://faculty.washington.edu/chudler/quotes.html> [2017.10.13.]

⁵ <http://www.unicef.org/dprk/ecd.pdf> [2017.10.13.]

⁶ <http://www.brainy-child.com/dl/brain-dev-report.pdf> [2017.10.13.]

this cooperation supporting the formation of this new subbranch of science stemming in neurology and pedagogy.

The human brain is a mysterious organ that offers serious learning challenges to scientists and child educators. At birth, the brain is remarkably unfinished. The period up to eight years is considered to be the peak time for brain development. Brain grows at an amazing speed, by the age of three there will be more than a thousand trillion connections between different neurons. The type of care that the child receives in his/her early life will decide the formation of neuron network. From birth to about the age of eight the brain is a super-sponge. This is the brain's most absorbent stage, where it actively learns from its environment.

“Windows of opportunity” are sensitive periods in children’s lives when specific types of learning take place. Information flows easily into the brain through 'windows' that are open for only a short duration. Then the 'windows' close, and much of the fundamental architecture of the brain is completed and probably not going to change very much more.

Scientists are continually learning more about how young children’s brains develop. At the same time, teachers are looking for effective strategies to help children use their brains to their fullest capacity. This paper also contributes to this dialogue by summarizing what we already know about the learning process in the brain and suggests how it might form the teaching and learning process in the classroom.

REFERENCES

- Ádám György (2004): *A rejtőzködő elme*. Budapest: Vince Kiadó.
- Battro A. M. (2013): *The Educated Brain: Essays in Neuroeducation*. Cambridge: Cambridge University Press.
- Bruer J. T. (1999): *The Myth of the First Three Years. A New Understanding of Early Brain Development and Lifelong Learning*. New York: The Free Press.
- Charlesworth R. (2013): *Understanding Child Development*. Belmont, USA: Wadsworth.
- Cséfalvay Zoltán (1990): *Térképek a fejünkben*. Budapest: Akadémiai Kiadó.
- Diamond M., Hopson J. (1999): *Magic Trees of the Mind: How to Nurture your Child's Intelligence, Creativity, and Healthy Emotions from Birth Through Adolescence*. London: Penguin Books.
- Evangelou M., Sylva K. and Kyriacou M. (2009): *Early Years Learning and Development. Research Report*. Oxford: University of Oxford.
- Goleman, D. (1997): *Érzelmi intelligencia*. Budapest: Háttér Kiadó.

- Hámori József (2005): *Az emberi agy plaszticitása*. Magyar Tudomány 1: 43.
- Kluge, N. (2003): *A gyermeklét antropológiája*. Budapest: Animula Kiadó és Magánéleti Kultúra Alapítvány.
- Montessori, M. (1936). *The secret of childhood*. London: New York Longmans, Green and Co.
- Nahalka István (2002): *Hogyan alakul ki a tudás a gyermekekben? Konstruktivizmus és pedagógia*. Budapest: Nemzeti Tankönyvkiadó.
- Papert S. (1988): *Észrengés. A gyermeki gondolkodás titkos útjai*. Budapest: Számítástechnika-alkalmazási Vállalat.
- Piaget, J. (1970): *Válogatott tanulmányok*. Budapest: Gondolat Kiadó.
- Pléh Csaba (2003): *A természet és a lélek*. Budapest: Osiris Kiadó.
- Postman, N. (1983): *The Disappearance of Childhood*. London: W. H: Allen.
- Prout, A. (2005): *The Future of Childhood*. London- New York: Routledge – Falmer. DOI: [10.4324/9780203323113](https://doi.org/10.4324/9780203323113)
- Ranschburg Jenő (2014): *A világ megismerése óvodáskorban*. Budapest: Saxum Kiadó.
- Shore, R. (1997). *Rethinking the Brain: New Insights into Early Development*. New York, NY: Families and Work Institute. 26–27.
- Sousa D. A. (2010): *Mind, Brain, and Education: Neuroscience Implications for the Classroom*. Bloomington, USA: Solution Tree Press.
- Sousa D. A. (2011): *The Best of Corwin: Educational Neuroscience*. California, USA: Corwin Press. DOI: [10.4135/9781483387734](https://doi.org/10.4135/9781483387734)
- Sprenger M. B. (2008): *The Developing Brain: Birth to Age Eight*. California, USA: Corwin Press. DOI: [10.4135/9781483329758](https://doi.org/10.4135/9781483329758)
- Wasserman L. H. (2013): *Early Childhood and Neuroscience - Links to Development and Learning*. New York, USA: Springer. DOI: [10.1007/978-94-007-6671-6](https://doi.org/10.1007/978-94-007-6671-6)